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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,258	10/31/2003	Sebastian C. Reyes	JCW-0306	2524
27810 7590 03/06/2007 ExxonMobil Research & Engineering Company P.O. Box 900 1545 Route 22 East Annandale, NJ 08801-0900			EXAMINER NGUYEN, TAM M	
			ART UNIT 1764	PAPER NUMBER

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/06/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/699,258

Applicant(s)

REYES ET AL.

Examiner

Tam M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

The rejection of claims 2 and 3 under 35 USC § 112 is withdrawn by the examiner in view of the amendment filed on December 11, 2006.

### ***Claim Objections***

Claim 1 is objected to because of the expression "a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> ratio" in line 8 of claim 1. It is unclear if it is a mass ratio or a molar ratio. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olson (6,488,741).

Olson discloses a process of selectively adsorbing propylene in a mixture of propylene/propane through the use of zeolites having structures with a maximum of 8 member rings of tetrahedra controlling the diffusion rate. The zeolites are those having the CHA (e.g., SSZ-13) and ITE structures. (See entire patent)

Olson does not disclose that the zeolite has a silica to alumina molar ratio greater than 50 and less than 200.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Olsen by utilizing a zeolite having silica: alumina molar ratio of about 199 because the difference between 199 and 200 is small. Therefore, it would be expected that the results would be the same or similar when operating the process at a molar ratio of 199 or 200.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olson (6,488,741) as applied to claim 1 above, and further in view of either Eberly et al. (3,591,488) or Wakita et al. (6,579,347).

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Olson discloses a process of selectively adsorbing propylene in a mixture of propylene/propane through the use of zeolites having structures with a maximum of 8 member rings of tetrahedra controlling the diffusion rate. The zeolites are those having the CHA (e.g., SSZ-13) and ITE structures. (See entire patent)

Olson does not specifically disclose a step of dealuminating the zeolite by using steam.

Both Eberly and Wakita teach a step of dealuminating a zeolite by steam. Eberly also discloses that the steam treating step is operated at a temperature of from 800-1500° F (700° K – 1089° K) and at an atmospheric pressure (101 kPa). (See Eberly: col. 9, lines 1-40; claim 1; Wakita: col. 8, lines 46-51)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process Olson by dealuminating the zeolite by steam as taught by either Eberly or Wakita because such step is known to be effective to remove alumina from the zeolite to a desirable level.

Claims 1-3 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramachandran et al. (EP 0572239 A1) in view of Addiego (EP 0769111 A1).

Ramachandran discloses a process for separating propylene from a mixture containing propylene and propane by using an adsorbent (e.g., 4A zeolite) having 8 member rings of tetrahedra. The adsorbent comprises alkali metal cations (e.g., sodium). See abstract; page 4, lines 14-26; page 5, lines 11-13.

Ramachandran does not disclose that the adsorbent has a silica to alumina ratio greater than 50 and less than 200, does not disclose that the zeolite adsorbent CHA or SSZ-13, and does not disclose that the cations are introduced by ion exchange at a pH greater than about 7.5.

Addiego discloses an adsorbent having a silica to alumina ratio of from 50 to 250. (See abstract; page 3, lines 38-50; page 4, line 7)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ramachandran by utilizing an adsorbent having a silica to alumina ratio as taught by Addiego because the teaching ratio would improve the adsorption properties of the adsorbent.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ramachandran/Addiego by using the claimed ratio of silica to alumina because one of skill in the art would use any ratios between 50 250 including 150.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ramachandran by using a zeolite adsorbent such as SSZ-13 because 4A zeolite has 8 member rings of tetrahedra as SSZ-13. Therefore, it would be expected that the results would be the same or similar when using a SSZ-14 or 4A zeolite in the process of Ramachandran.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ramachandran by introducing ion exchange at a pH greater than about 7.5 because it is within the level of one of skill in the art to process the zeolite at the claimed pH to obtain a zeolite having a low acidity.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over references as applied to claim 1 above, and further in view of either Eberly et al. (3,591,488) or Wakita et al. (6,579,347).

Ramachandran and Addiego do not specifically disclose a step of dealuminating the zeolite by using steam.

Both Eberly and Wakita teach a step of dealuminating a zeolite by steam. Eberly also discloses that the steam treating step is operated at a temperature of from 800-1500° F (700° K – 1089° K) and at an atmospheric pressure (101 kPa). (See Eberly: col. 9, lines 1-40; claim 1; Wakita: col. 8, lines 46-51)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process Ramachandran/Addiego by dealuminating the zeolite with steam as taught by either Eberly or Wakita because such step is known to be effective to remove alumina from the zeolite to produce a zeolite with desirable silica: alumina ratios (e.g., 50-250).

### *Response to Arguments*

The Declaration filed December 12, 2006 has been fully considered but it is not persuasive. Even though the term “SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> ratio” is commonly used as molar ratio, the term is not absolutely always meant molar ratio. For examples, the JP-A-8-224449 patent claims a zeolite having a **weight ratio** of silica to alumina of larger than 300. A “molar ratio” should be inserted into the claims if it is intended.

The argument that it is not obvious to use a low Si/Al ratio in the process of Olson because of deleterious polymerization is not persuasive. Olson teaches that the ratio is at least **about** 200 and the examiner maintains that utilizing a zeolite having silica: alumina molar ratio of about 199 would be obvious to one of skill in the art because the difference between 199 and

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200 is small. Therefore, it would be expected that the results would be the same or similar when operating the process at a molar ratio of 199 or 200.

The argument that the use of ion-exchange alkali cations in a zeolite with  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratio greater than 50 and less than 200 to significantly improve the recovery of the adsorbed compound as discovered in the presently claimed invention is not taught by Olson is not persuasive. Olson teaches that the zeolite comprises alkali cations as claimed and the examiner has modified the process of Olson by utilizing a molar ratio of 199. It would be expected that absorbent of Olson would have the characteristic as claimed

The argument that Eberly does not teach the steaming of a zeolite to improve adsorption/desorption characteristic of the zeolite and Eberly fails to provide any teaching for using alkali metal cations in the zeolite framework is claimed is not persuasive. The examiner relied upon Eberly to teach that the steaming step is known in the art. Olson already teaches the zeolite with alkali metal cations. The reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. In re Linter, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), cert. denied, 500 U.S. 904 (1991).

The argument that Wakita teaches utilizing a 10-ring zeolite, not the 8-ring zeolites, does not teach a separation process as claimed and does not teach a kinetic process as claimed is not persuasive. The examiner relied upon Wakita to teach that the steaming step is known in the art for dealumination.



The argument that the steam dealumination step of Wakita is in conflict with the notion that one of skill in the art and knowledge of Wakita would be motivated to steam the zeolite of the present invention is not persuasive. The steam step of Wakita is used to adjust the dealumination of the zeolite. One of skill in the art would use the steam step of Wakita to remove alumina from the zeolite to meet the desirable amount of alumina in the zeolite.

The argument that the process of Ramachandran is not a kinetic separation process is not persuasive because the modified process of Ramachandran is essentially the same as the claimed process. It would be expected there is some kinetic separation would be occurred in the process as claimed.

The argument that there is not teaching or motivation by Ramachandran to ion exchange an alkali metal cation into the zeolitic framework in order to improve the adsorption/desorption properties of an 8-membered ring zeolite and the zeolite of Ramachandran would have a ratio equal to 1 and dealuminating the zeolite would destroying the structure of it is not persuasive. The zeolite of Ramachandran comprises alkali metal cations as claimed. There is not evidence that the zeolite of Ramachandran has the ratio of 1. In addition, the examiner had modified the process of Ramachandran by using SSZ-13 zeolite. One of skill in the art would dealumination the SSZ-13 zeolite to meet the desired ratio as taught by Addiego

The argument that although Ramachandran state that it may be desirable to exchange some of the sodium ions by other metals, it is not clear what properties the “desirable results” obtain while providing a laundry list of material is not persuasive. Regardless what the “desirable results” is, Ramachandran suggests that the metal can be exchanged as claimed.

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The argument that it not obvious to combine the references since Addiego does not teach or suggest that alkali metal cations is added to the zeolite to beneficial the kinetic-based separations is not persuasive. Ramachandran already teaches the alkali metal cations. The examiner relied upon Addiego to teach the claimed molar ratio which is known in the art and it is obvious to use the ratio in the process of Ramachandran because the teaching ratio would improve the adsorption properties of the adsorbent.

The argument that neither Ramachandran nor Addiego teaches or suggests the CHA or SSZ-13 zeolite is not persuasive. The examiner maintains that one having ordinary skill in the art motivate to have modified the process of Ramachandran by using a zeolite adsorbent such as SSZ-13 because 4A zeolite has 8 member rings of tetrahedra as SSZ-13. Therefore, it would be expected that the results would be the same or similar when using a SSZ-14 or 4A zeolite in the process of Ramachandran.

For the arguments about Eberly and Wakita, please see the response above.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (571) 272-1452.

The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tam M. Nguyen  
Examiner  
Art Unit 1764



TN